ZEKTOR™

Home Theater Solutions

HDMI5

Digital Video Switch

Rev 1

06/27/2007

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What's Inside

Thank you for your purchase of the HDMI5 High Definition Component Video Switch.

Every care has been taken to assure you of a successful installation and subsequent operation of your new HDMI5 video switch, however should something go wrong, and warranty repair work is needed, we request that you hold on to the original packaging materials.

Please take this time to verify the contents of the HDMI5 box.

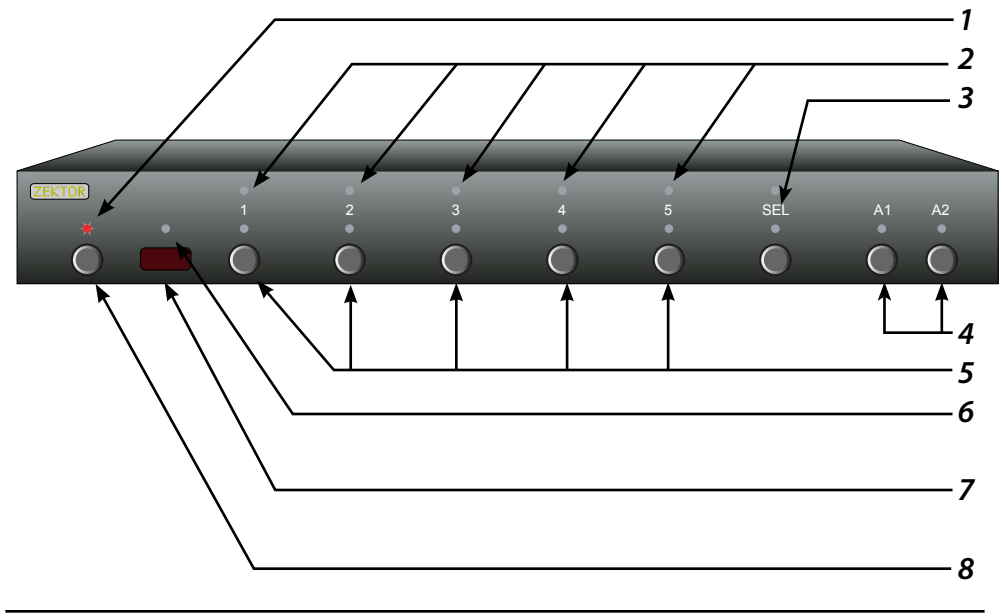
The following should be included:

1. HDMI5
2. Remote Control (ZRM1)
3. Power Supply Module
4. This User's Manual

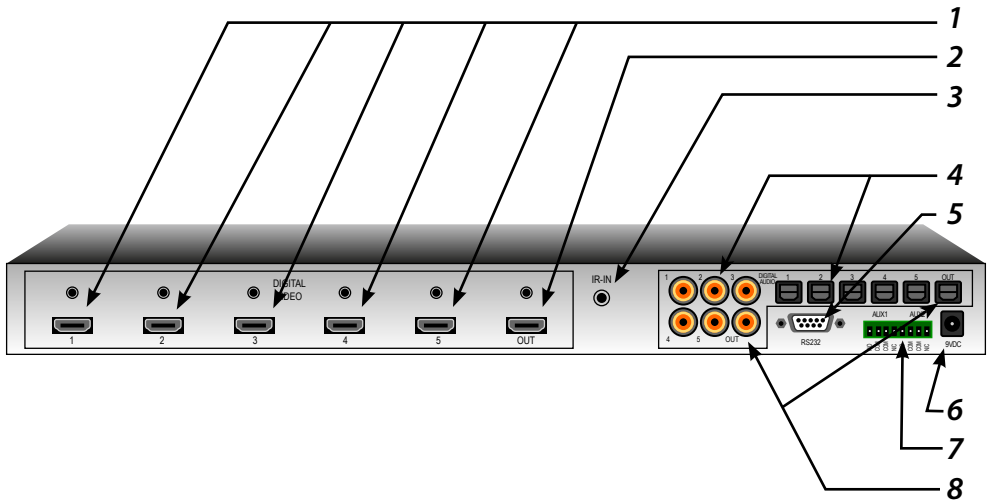
If anything is missing please get in touch with us as soon as possible so that we can correct the situation.

An Overview of the HDMI5

Front Panel



Rear Panel



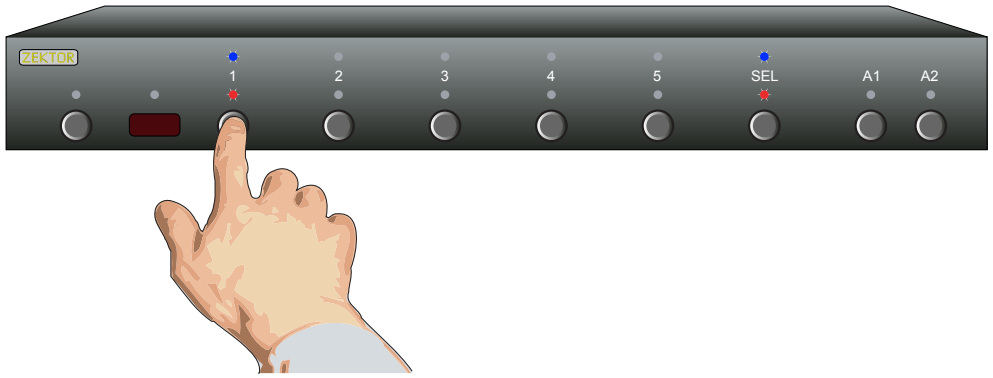
Front Panel Controls:

1. Power Indicator. Lights up in standby mode.
2. Selection LEDs. Indicate currently selected inputs.
3. Select between Normal/Audio/Video Breakaway.
4. Toggle Auxiliary Relays.
5. Input Selection Buttons.
6. Infrared Received Indicator. Flashes when IR is received.
7. Infrared Remote Sensor Window.
8. Power Toggle Button.

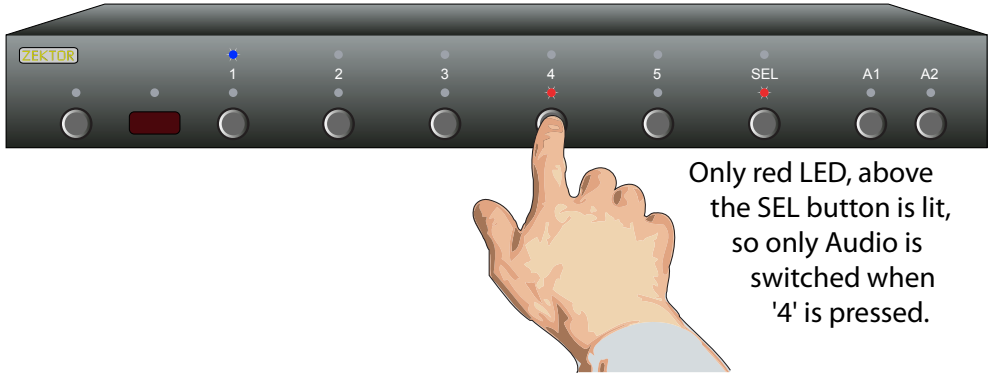
Rear Panel Connections:

1. HDMI Inputs. HDMI (or DVI when using conversion cable), compatible digital inputs. All inputs are fully HDCP compatible with both HDMI and DVI formats. All inputs are fully HDMI audio compatible.
2. HDMI Output (or DVI Output when using conversion cable).
3. IR Input or +12V Trigger Input. Accepts modulated or unmodulated IR signals, or +12V Trigger On/Off voltage.
4. Digital Audio Inputs. Each video input has an associated digital audio channel with both a Coax and an Optical connection. Only one of the two types of inputs can be active at any time. The HDMI5 will auto-select between the two types of signals. If a signal is supplied to both the Coax and Optical inputs, the Coax signal is given priority.
5. RS-232 jack.
6. DC Power Jack Connector.
7. Auxiliary Relay Connections.
8. Digital Audio Outputs. All digital audio inputs are automatically converted to both Coax and Optical outputs. Both the Coax and Optical outputs are available simultaneously.

Selecting an Input: Press numbered buttons to select an input.

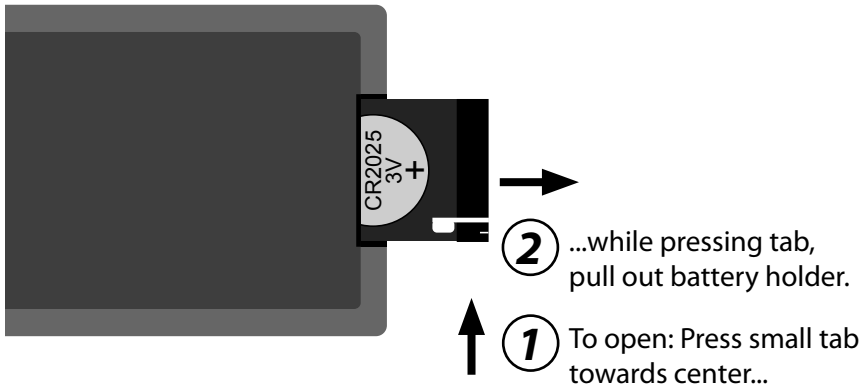


Audio / Video Breakaway: Press SEL to toggle breakaway options.



Only red LED, above the SEL button is lit, so only Audio is switched when '4' is pressed.

Installing battery (view from back of remote)



Easy, Simple, Instructions!

Initial Setup...

- Use the HDMI connections to switch HDMI signals. Use the digital audio connectors to switch digital audio signals, with automatic conversion between the optical and coax digital audio formats.
- If using a hardwired IR controller to operate the HDMI5, connect the controller IR cable to the IR/Z-IN jack.
- If using a PC (or other serial controller), connect it to the RS-232 jack using a standard serial cable.
- Plug the power module into the HDMI5, and plug the module into a standard A.C. wall receptacle. The standby LED will light up.

Selecting an Input...

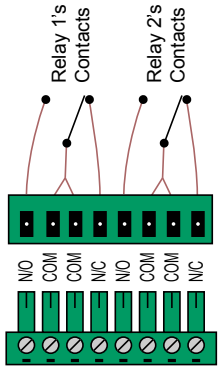
- To switch between any of the five inputs, simply press the button for the desired input. If the HDMI5 is in the standby mode, it will turn on. The HDMI5 will then switch to the selected input, and the associated LEDs will light to indicate this.
- To place the HDMI5 back into the standby mode, press and release the Power Toggle button. The channel LEDs will all go blank, and the standby LED will light up. Press the Power Toggle button again to re-select the previously selected input.

Audio / Video Breakaway...

- To breakaway the audio or video (to listen to the digital audio from one input while viewing video from another) press the SEL key. When both the RED and BLUE LEDs above the SEL button are lit, then the audio and video inputs will be switched simultaneously. When only the RED LED is lit, then only the Audio will be switched. Similarly, when only the BLUE LED is lit, only the video will be switched when pressing an input button.

Note: **Audio breakaway only applies to the digital audio connections on the back of the HDMI5. You cannot breakaway the HDMI audio channel that is sent over the HDMI cable. HDMI audio will always follow the video signal.**

Auxiliary Relay Connections

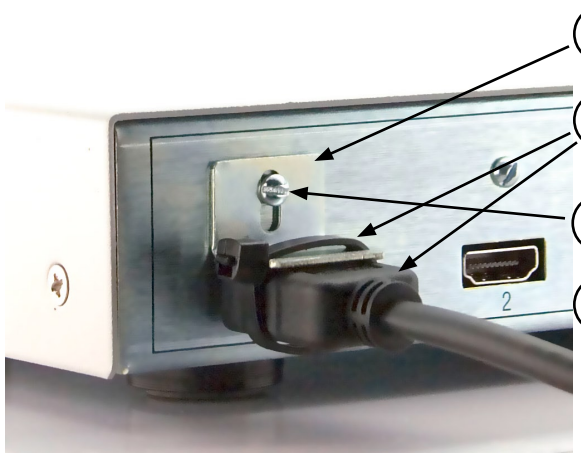


N/O = Normally Open Contacts. These contacts are open when the relay's LED is not lit.

COM = Common

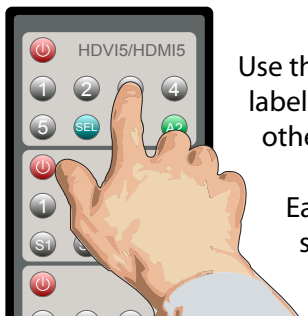
N/C = Normally Closed Contacts. These contacts are closed when the relay's LED is not lit.

Make connections to the adapter which plugs into the HDMI5.



1. Position the clamp as shown and lightly tighten the screw.
2. Plug in HDMI cable and use wire tie, as shown, to hold cable in position.
3. Fully tighten down screw to hold clamp in place.
4. To remove, or reposition HDMI cable, unscrew clamp, leaving wire tie in place.

Using the supplied Remote Control



Use the remote controller buttons in the section labeled: HDMI5 / HDMI5. (The other sections control other Zektor products)

Each button on the remote corresponds to the same button on the HDMI5's front panel.

Instructions (Cont'd)

Auxiliary Relay Connections

- The auxiliary relay contacts are rated for 30volts @ 5amps, A.C. or D.C., and can be used to switch on and off anything you can think of within those limits.
- Each relay has a Normally Open connection, two Common connections, and a Normally Closed connection.
- The diagram to the left demonstrates the internal connections to the relays.
- By using the supplied adapter, the relays connections can be made before rack mounting the HDMI5.
- The A1 and A2 buttons are used to toggle on and off the relays.
- The relays can also be setup to turn off after a given amount of time. Or to turn on whenever specified channels are selected. See the section *"Auxiliary Relay Options"* for relay setup information.

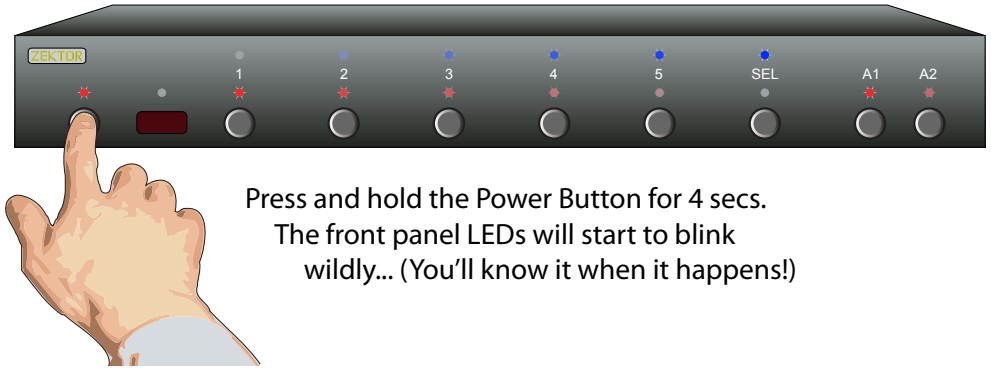
Using the Secure HDMI™ brackets

- Start by attaching the bracket to the back of the HDMI5 using one of the supplied screws. Tighten the screw just enough to keep the bracket securely against the back of the HDMI5, but still allow free movement.
- Plug in the HDMI cable. Since the bracket is free to move you can adjust it to fit any size connector. Use a wire tie to hold the bracket against the cable.
- Once the wire tie is in place you can tighten the screw to securely hold the bracket and HDMI cable in place.
- If you need to temporarily remove the HDMI cable, or position it to another input, simply unscrew the bracket from the back of the HDMI, there is no need to remove the wire tie.
- More wire ties can be purchased at most electronic and hardware stores.

Using the supplied Remote Control

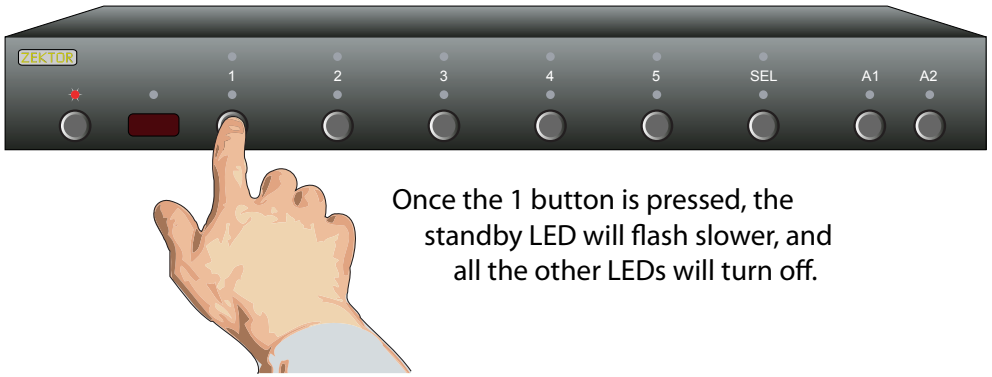
- Install battery using the diagram on the previous page.
- Use the section of the remote controlled labeled: HDMI5/ HDVI5 for controlling the HDMI5. (The other sections are used to control other Zektor products).
- Each button on the remote functions the same as the front panel switch with the same name.

Step 1: Put the HDMI5 into the Setup Mode



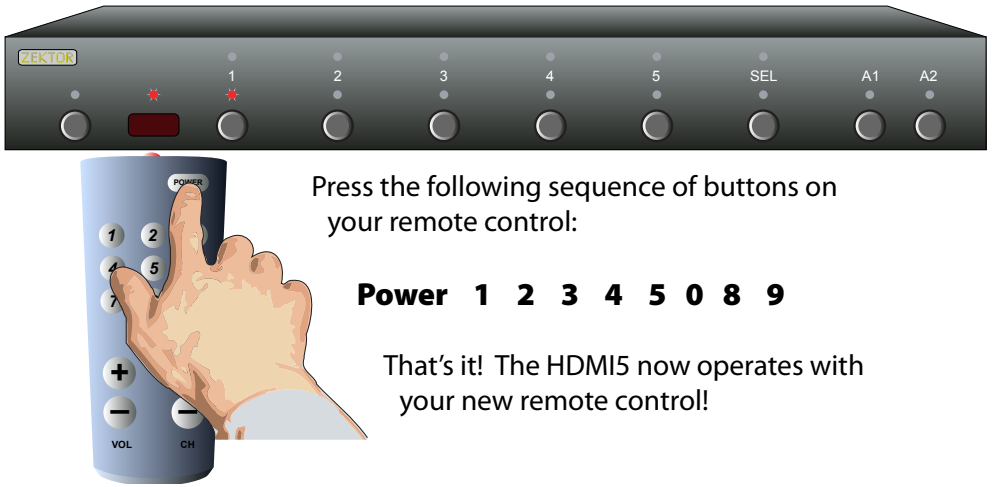
Press and hold the Power Button for 4 secs. The front panel LEDs will start to blink wildly... (You'll know it when it happens!)

Step 2: Press the '1' button for Intelligent-IR™ learning



Once the 1 button is pressed, the standby LED will flash slower, and all the other LEDs will turn off.

Step 3: Teach the HDMI5 its new IR codes



Press the following sequence of buttons on your remote control:

Power 1 2 3 4 5 0 8 9

That's it! The HDMI5 now operates with your new remote control!

Using a Different Remote

The HDMI5 features Zektor's Exclusive Intelligent-IR™, and with very few exceptions can be setup to use any remote you can point at it! This is useful if you have more than one HDMI5 in the same room.

Pick a new remote

- Start by picking a new remote you'd like to use with the HDMI5. (Or use the unused buttons on the HDMI5's remote.)
- If you plan on using a universal remote, start by setting it up as a remote for a TV or VCR that you don't own. (For instance if you don't own a Sony TV, setup your universal remote to control a Sony TV.)

Step 1: Put the HDMI5 into the Setup Mode

- The HDMI5 is placed into the setup mode by pressing and holding the Power button for about 4 seconds.

Step 2: Select the Intelligent-IR™ Learn Mode

- Select the Intelligent-IR™ Learn Mode pressing '1'.
- Once the '1' button is pressed, the standby LED will flash slower and all the other LEDs will turn off. The HDMI5 is now waiting for new IR codes to be sent from your remote control.

Step 3: Teach the HDMI5 your new remote control codes

- On your remote control, press the following buttons, in the following order:

  Power 1 2 3 4 5 0 8 9

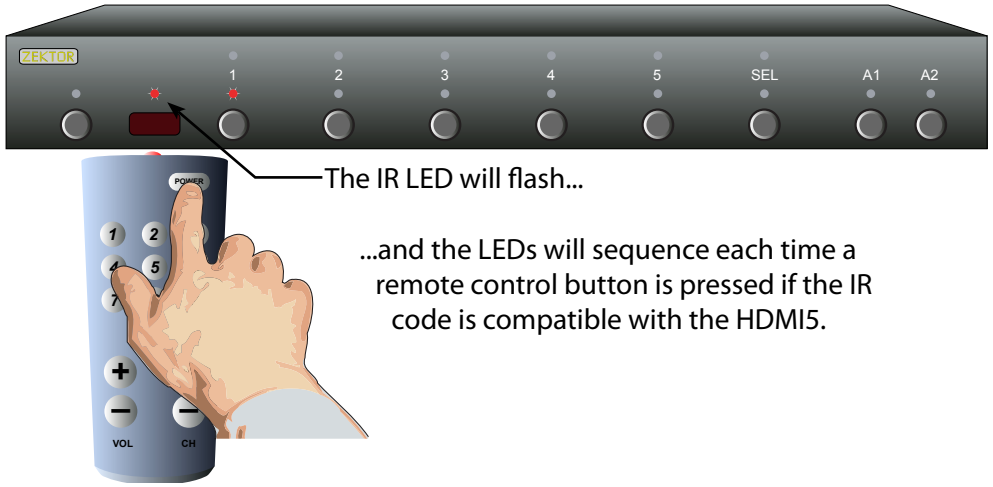
- The front panel LED's will sequence as each button is pressed, and the IR LED will flash for each button -- if not, see the following section on *"More Remote Options"*.
- That's it! The HDMI5 will return to the state it was in before setup, and will now work with your new remote!

The new control buttons on your remote are...

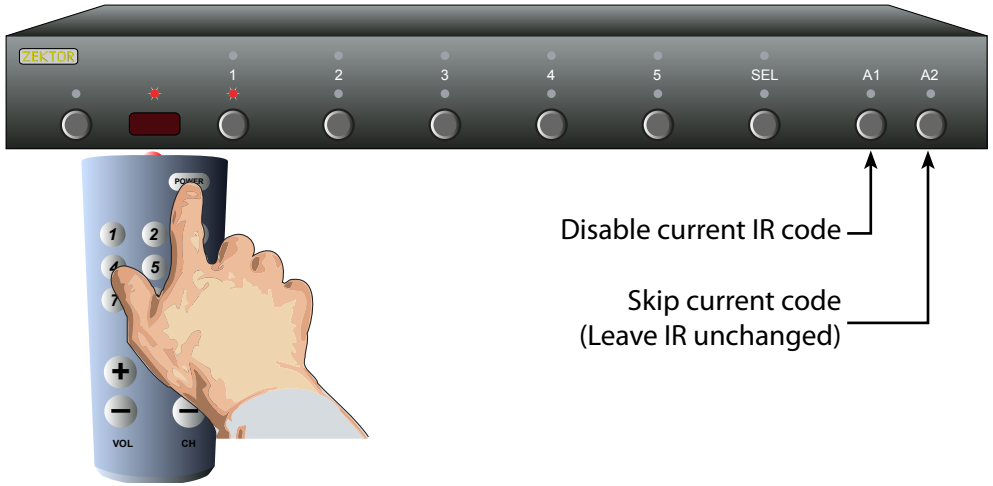
Power	Toggles the HDMI5's power.
1 - 5	Selects inputs 1 through 5.
0	Sequences the SEL button (A/V breakaway).
8	Toggles Auxiliary Relay 1.
9	Toggles Auxiliary Relay 2.

Note: All remote control codes are saved in non-volatile memory and will not be lost during a power failure.

Front panel LED sequencing while learning



Skipping or Deleting IR codes



More Remote Options

Front panel LED sequencing while learning

During the learning process, as each button of the remote is pressed, the front panel LEDs will sequence. At any given time, the LED that is slowly flashing, indicates the function the HDMI5 is currently waiting to learn. The sequence is:

Standby LED	Waiting for Power Toggle IR code.
'1' - Red LED	Waiting for the '1' IR code.
'2' - Red LED	Waiting for the '2' IR code.
'3' - Red LED	Waiting for the '3' IR code.
'4' - Red LED	Waiting for the '4' IR code.
'5' - Red LED	Waiting for the '5' IR code.
'SEL' Red LED	Waiting for 'SEL' IR code.
'A1' LED	Waiting for 'A1' IR code.
'A2' LED	Waiting for 'A2' IR code.

If the LEDs do not sequence, and the IR LED does not flash, when a button is pressed on the remote, then the HDMI5 does not recognize the IR code being sent. Make sure the remote's batteries are fresh.

The HDMI5 will work with most remotes, however there are a few exceptions. Some technical reasons for not working with some remotes are: The remote may be using a carrier frequency outside the range of the HDMI5 (34KHz to 42KHz), or it may be using one of the few protocols the HDMI5 does not understand, like the Philip's RC5 and RC6 protocols.

If the HDMI5 does not learn the remote codes you are using, you will have to use another remote, or in the case of using a universal remote, you'll have to pick a different manufacturer's code.

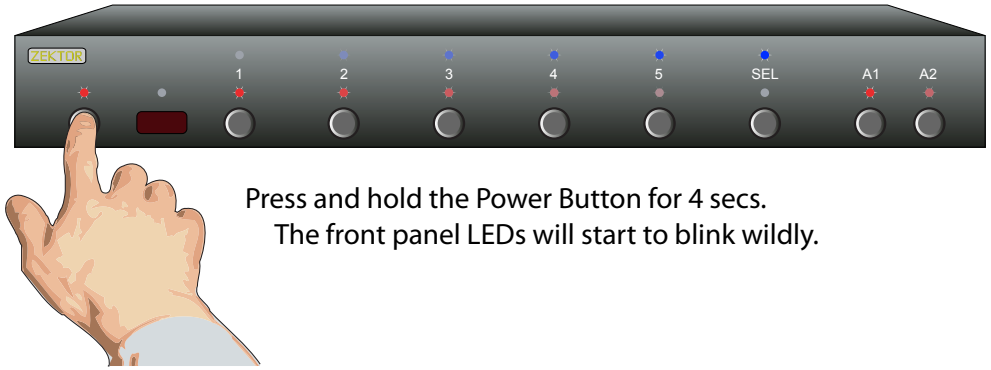
Skipping or Deleting IR codes

During the IR learning process you can choose to delete the current code (disable IR for that function) or skip the current code (leave it unchanged) by pressing the 'A1' or 'A2 buttons:

'A1' Disable IR for current function.

'A2' Skip current code, leave it unchanged.

Step 1: Put the HDMI5 into the Setup Mode

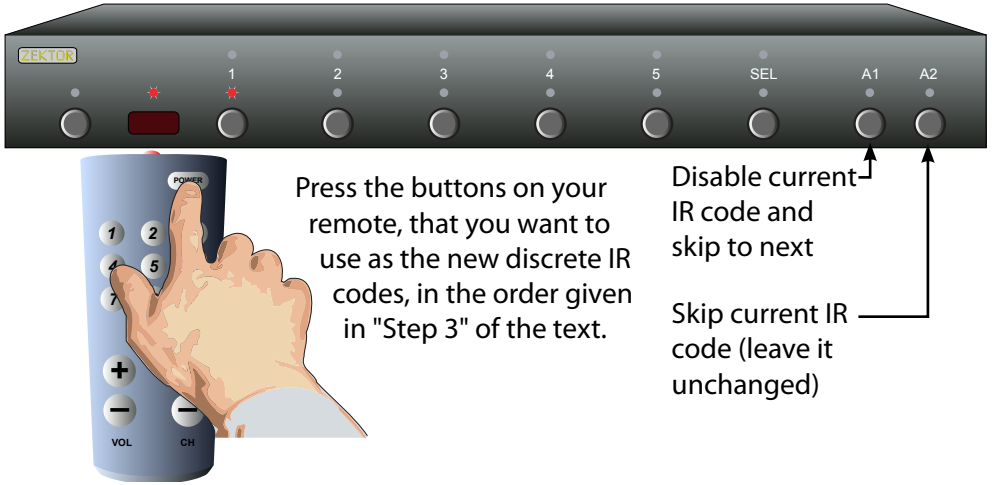


Press and hold the Power Button for 4 secs.
The front panel LEDs will start to blink wildly.

Step 2: Press the '2' button for Intelligent-IR™ learning

Once the 2 button is pressed, the HDMI5 will be ready to learn new discrete IR codes starting with "Discrete Power On".

Step 3: Teach the HDMI5 its new IR codes



Press the buttons on your remote, that you want to use as the new discrete IR codes, in the order given in "Step 3" of the text.

Disable current IR code and skip to next

Skip current IR code (leave it unchanged)

Learning New Discrete IR Codes

The HDMI5 allows discrete IR control over all of it's functions. These codes can also be reprogrammed as described here.

Pick a remote

- Start by picking the remote you'd like to use with the HDMI5. (Unused buttons on the supplied remote work fine.)

Step 1: Put the HDMI5 into the Setup Mode

- The HDMI5 is placed into the setup mode by pressing and holding the Power button for about 4 seconds.

Step 2: Select the Intelligent-IR™ Learn Mode

- Discrete IR learning is selected by pressing the '2' button.
- Once the '2' button is pressed, the standby LED will flash slower and all the other LEDs will turn off. The HDMI5 is now waiting for new IR codes to be sent from your remote control.

Step 3: Teach the HDMI5 your new discrete IR control codes

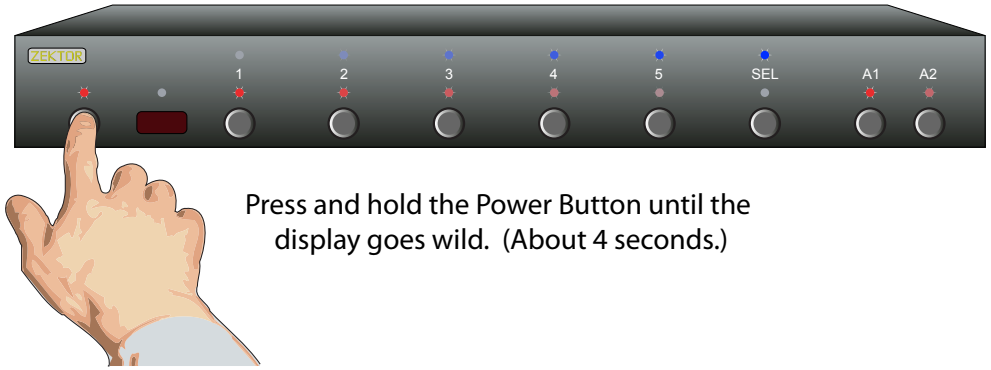
- On your remote control, press the buttons you'd like to use as discrete IR codes, in the following order:

Power On	- Turns On Power
Power Off	- Turns Off Power
Sequence Inputs	- Sequence through inputs
No Breakaway	- Resets audio/video breakaway
Breakaway Audio	- Sets audio breakaway mode
Breakaway Video	- Sets video breakaway mode
Aux Relay 1 On	- Turns on Aux Relay 1
Aux Relay 1 Off	- Turns off Aux Relay 1
Aux Relay 2 On	- Turns on Aux Relay 2
Aux Relay 2 Off	- Turns off Aux Relay 2

- The new codes are learned in the above order, for instance the first button you press, on the remote, will be use as the new discrete "Power On", the second button pressed will be used as the new "Power Off", etc.
- The 'A1' can be pressed to disable the current IR code.
- The 'A2' can be pressed to skip the current IR code, leaving it unchanged.

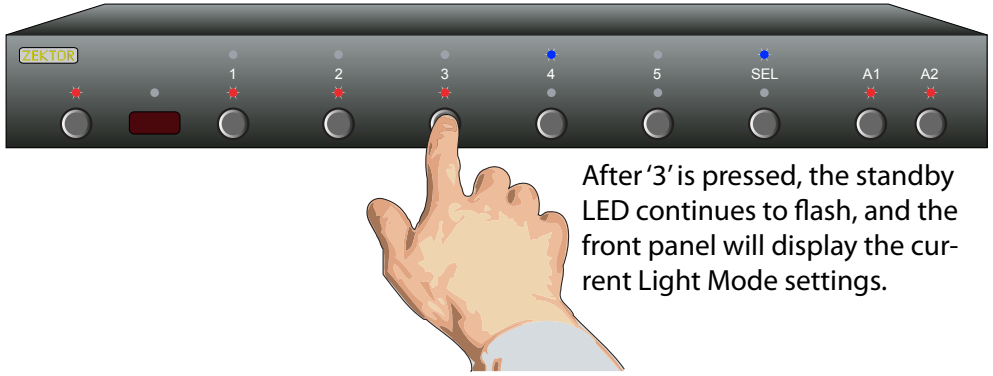
Note: All remote control codes are saved in non-volatile memory and will not be lost during a power failure.

Step 1: Place the HDMI5 into the Setup Mode



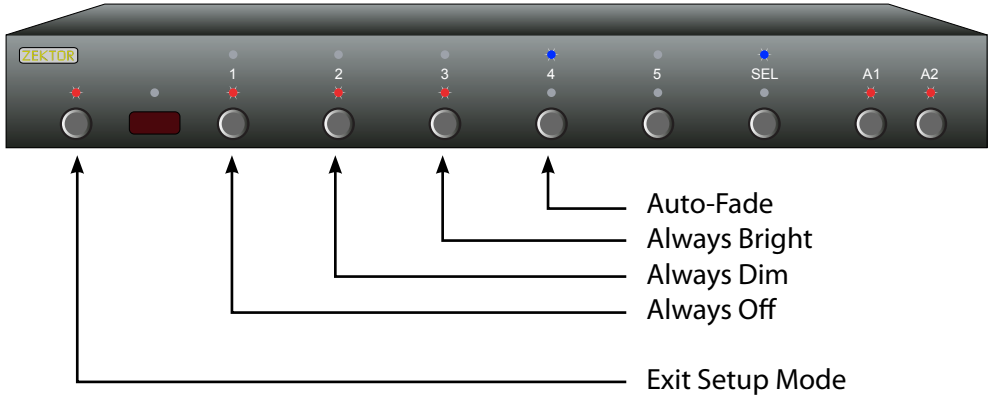
Press and hold the Power Button until the display goes wild. (About 4 seconds.)

Step 2: Select "Lighting Mode" option



After '3' is pressed, the standby LED continues to flash, and the front panel will display the current Light Mode settings.

Step 3: Choose a new lighting mode



Controlling the Front Panel Lights

There are four different front panel lighting modes available on the HDMI5. They are:

- Front panel lights automatically fade from bright to dim after 4 seconds of inactivity.
- Front panel lights are always at the bright level.
- Front panel lights are always at the dim level.
- Front panel lights are turned off.

Note: The intensities of the both the bright and dim levels can be adjusted as well. This is explained on the next page.

To change the front panel lighting mode...

Step 1: Enter the Setup Mode

- The HDMI5 is placed into the setup mode by pressing and holding the Power button for about 4 seconds.

Step 2: Select the Lighting Mode option

- Press the '3' button to select the "Lighting Mode" option.
- The front panel selection LEDs now indicate the currently selected light mode as follows:

  If '1's blue LED is lit, then front panel lights are always off.

  If '2's blue LED is lit, then front panel is always dim.

  If '3's blue LED is lit, then front panel is always bright.

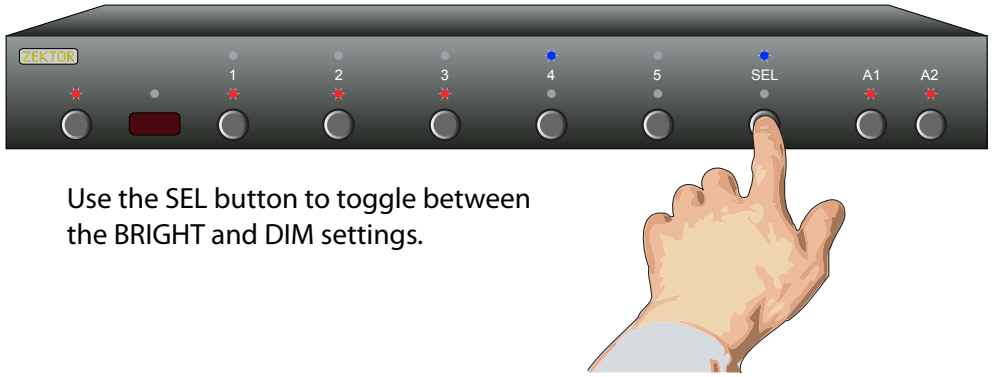
  If '4's blue LED is lit, then front panel lights auto-fade from bright to dim after 4 seconds of inactivity.

Step 3: Choose a new lighting mode

- Choose a new light control mode by pressing the associated selection button.
- Press the Power Button to save the new mode and return to normal operations.

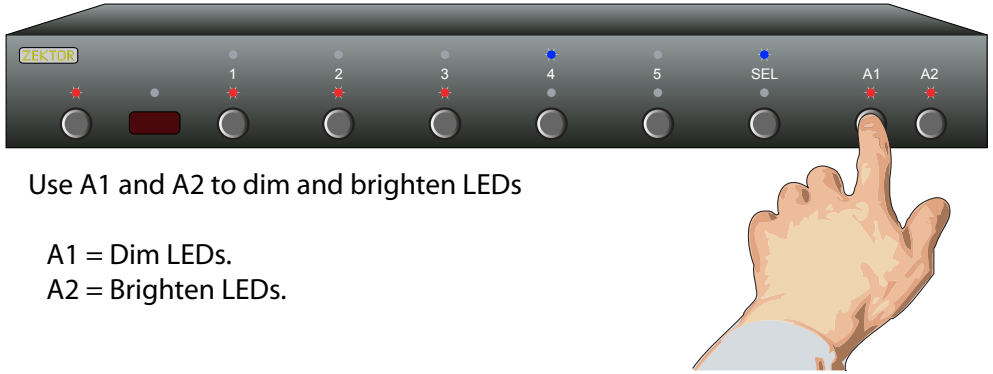
Note: The lighting mode setting is saved in non-volatile memory and is not affected by a power failure.

Step 4: Select between Bright and Dim settings: Use SEL button.



Use the SEL button to toggle between the BRIGHT and DIM settings.

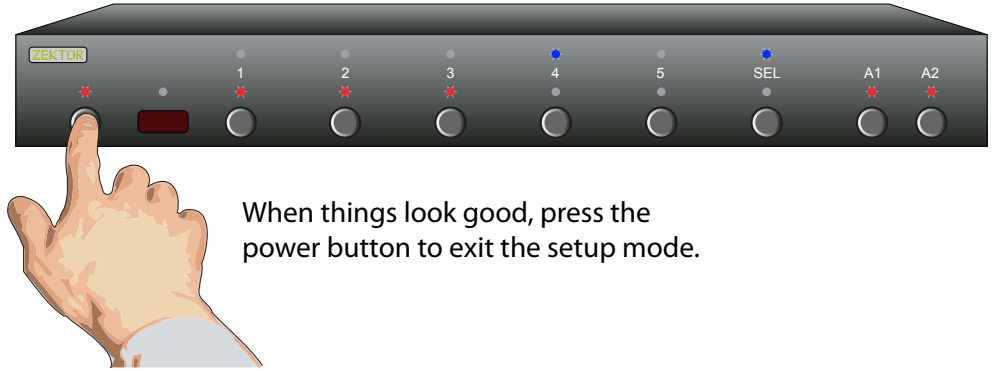
Step 5: Adjust Front Intensities.



Use A1 and A2 to dim and brighten LEDs

A1 = Dim LEDs.
A2 = Brighten LEDs.

Step 6: Use the Power Button to Exit.



When things look good, press the power button to exit the setup mode.

Adjusting the Front Panel Intensity

Continued from previous page...

If you have not already done so, perform Steps 1 and 2 on the previous page.

Step 4: Toggle between Bright and Dim Settings

- The 'SEL' LED indicates the front panel intensity settings:
  If BLUE LED is lit, then the BRIGHT level is being adjusted.
  If RED LED is lit, then the DIM level is being adjusted.
- Use the 'SEL' button to toggle between bright and dim settings.

Step 5: Adjust Front Panel Intensities

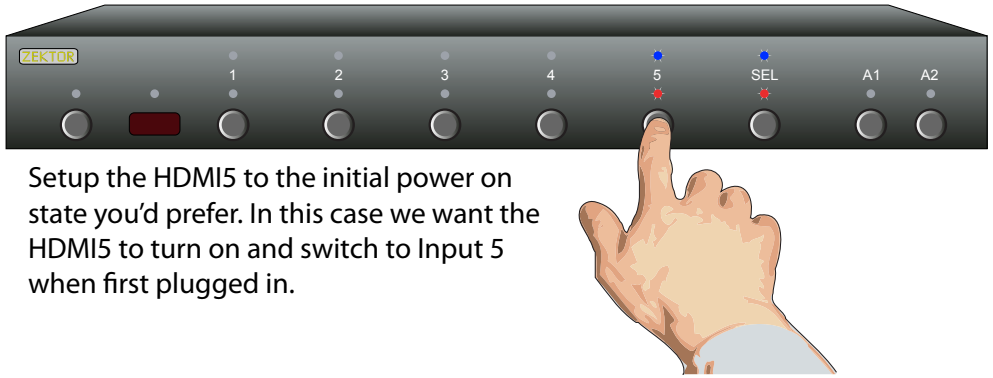
- Use the 'A1' button to decrease the intensity of the front panel lights.
- Use the 'A2' button to increase the intensity of the front panel lights.
- You cannot make the DIM level brighter than the BRIGHT level, and you cannot make the BRIGHT level dimmer than the DIM level.

Step 6: Use the Power Button to Exit

- Once the front panel intensities are acceptable, press the Power button to save the new settings and exit the setup mode.

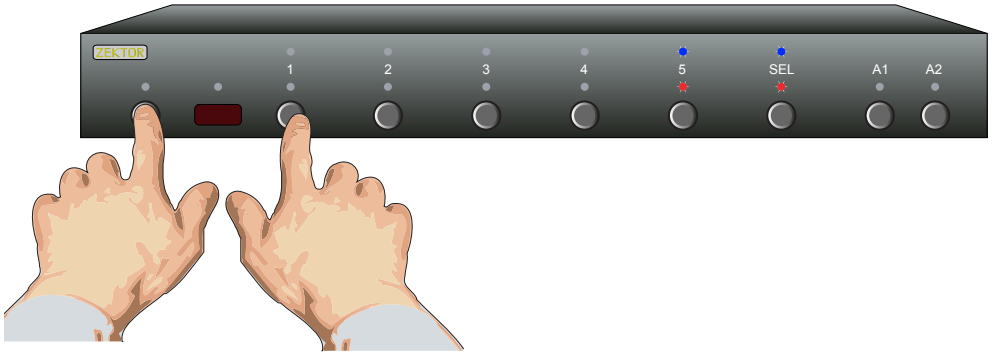
Note: The new intensity settings are saved in non-volatile memory and are not affected by a power failure.

Step 1: Set the HDMI5 to the preferred initial power on state



Setup the HDMI5 to the initial power on state you'd prefer. In this case we want the HDMI5 to turn on and switch to Input 5 when first plugged in.

Step 2: Save the new initial power on state



1. Start by pressing and holding the Power button...

2. ...while continuing to hold the Power button, press and hold the '1' button.

3. After about 4 seconds, the display will flash indicating the new power on state has been accepted.

Setting the Initial Power On State

As long as the HDMI5 is plugged in, it will remember the previously selected input in standby mode. When powered up by pressing the Power button, it will return to that previously selected channel.

However, if power is removed (for instance a plug strip used to power the HDMI5 is turned off), and then re-applied, the HDMI5's default behavior is to enter into the standby mode.

It is possible to change the power on behavior of the HDMI5.

To change the power on defaults...

Step 1: Setup the HDMI5 to your preferred power on state.

- Use the front panel buttons to setup the HDMI5 to the operating settings you'd like at initial power up.

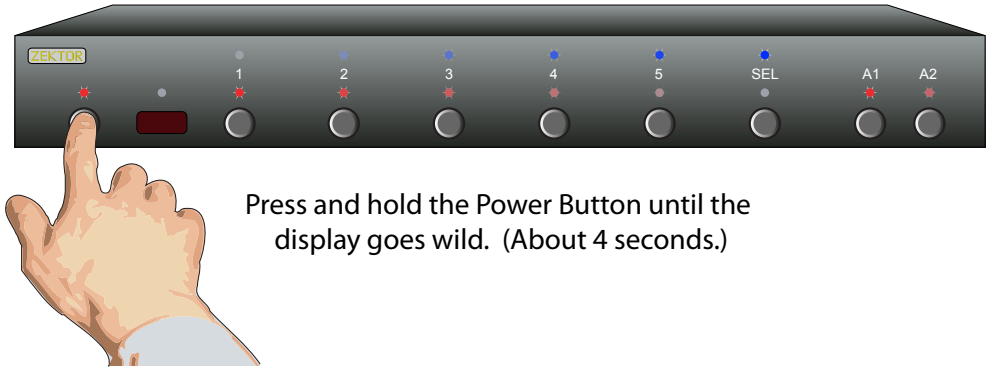
Step 2: Save the new initial power on state.

1. First press and hold the Power button.
2. While continuing to hold the Power button, press and hold the '1' button.
3. After holding both buttons for about '4' seconds, the display will blink indicating the new power on defaults have been accepted.

Test the new initial power on state

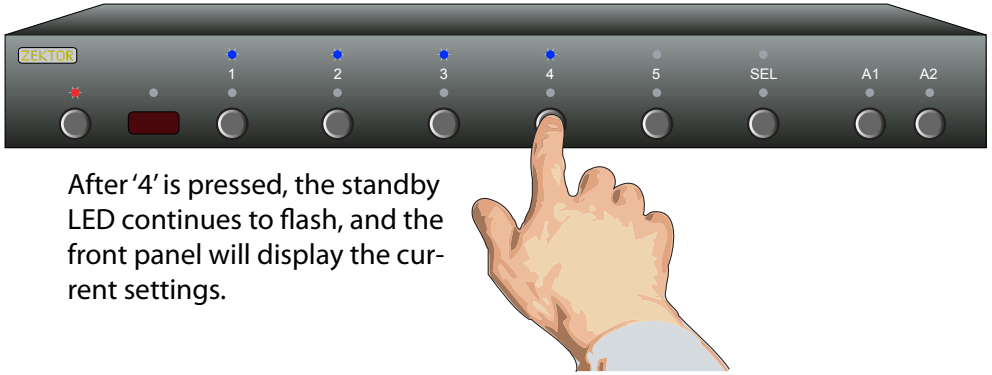
- You can test the new defaults by either disconnecting the power supply from the back of the HDMI5 or by unplugging the power supply from the wall.
- Reconnect power. The HDMI5 will power up into your new power on default state.

Step 1: Place the HDMI5 into the Setup Mode



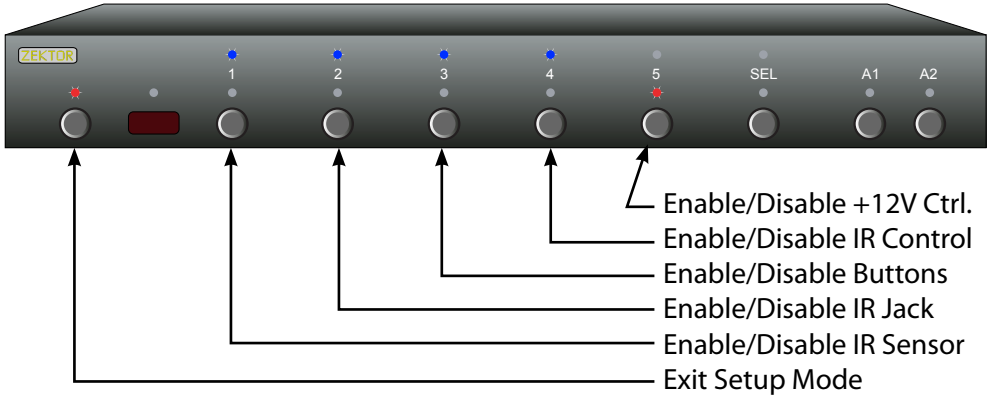
Press and hold the Power Button until the display goes wild. (About 4 seconds.)

Step 2: Enter the Enable / Disable control state



After '4' is pressed, the standby LED continues to flash, and the front panel will display the current settings.

Step 3: Enable or Disable control functions



Control Functions

If you are using the rear panel IR jack, you might want to disable the IR sensors to prevent use of the remote control.

Or if you have a household with young curious fingers that likes playing with buttons, you also have the capability of disabling the front panel switches and only operating the HDMI5 with a remote.

To enable / disable the front panel switches, and other control functions...

Step 1: Enter the Setup Mode

- The HDMI5 is placed into the setup mode by pressing and holding the Power button for about 4 seconds.

Step 2: Enter the Enable / Disable control state

- While in the setup mode, press '4' to enter the Enable/Disable control state. The current status will be displayed using the front panel LEDs.
- A Blue LED indicates an option is enabled, and Red LED indicates disabled.

Step 3: Enable or Disable control functions

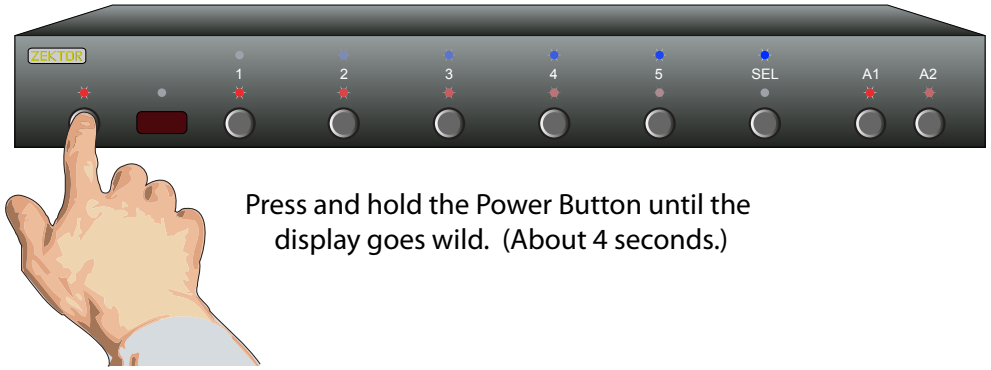
- Use '1' to enable/disable the IR Sensor hardware.
- Use '2' to enable/disable the IR Jack hardware.
- Use '3' to enable/disable the front panel buttons.
- Use '4' to enable/disable IR control.
- Use '5' to enable/disable +12V On/Off control.

Note 1: The IR Jack and +12V On/Off control functions are mutually exclusive. Enabling +12V On/Off control will disable the IR Jack hardware. Enabling IR Jack hardware will disable +12V On/Off control.

Note 2: When disabling the IR Jack and IR Sensor, the hardware is disabled. Whereas 'IR Control' enables/disables whether the HDMI5 responds to IR signals received. If the IR Sensor or IR Jack are enabled, and 'IR Control' disabled, IR signals can still be read through the RS-232 port, while being ignored by the HDMI5.

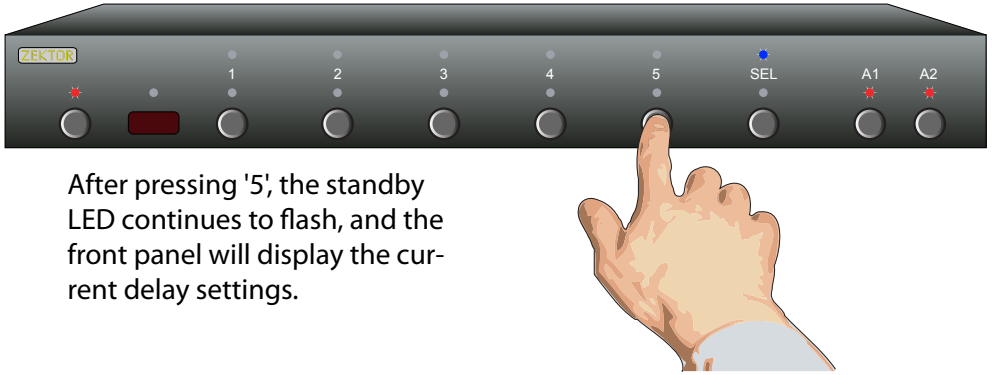
Note 3: Disabling the front panel buttons does not disable the ability to enter the Setup Modes.

Step 1: Place the HDMI5 into the Setup Mode



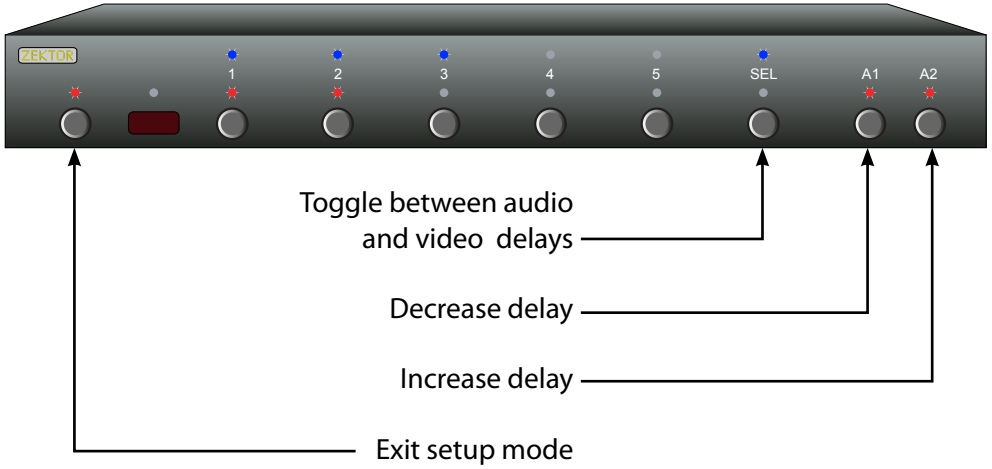
Press and hold the Power Button until the display goes wild. (About 4 seconds.)

Step 2: Enter the Switching Delay Setup Mode.



After pressing '5', the standby LED continues to flash, and the front panel will display the current delay settings.

Step 3: Adjust Switching Delay Times



Changing Switching Delays

The HDMI5 allows adjusting the its "Mute Delay" times, for Video and Audio, independently. The "Mute Delay" is the amount of time the HDMI5 mutes the output when switching inputs. For instance a "Mute Delay" of 100ms causes the switch to mute its output 100ms before switching to the new input. By default the HDMI5 uses a 200ms video and audio delay when switching between channels.

To adjust the Audio/Video mute delays...

Step 1: Place the HDMI5 into the Setup Mode

- The HDMI5 is placed into the setup mode by pressing and holding the Power button for about 4 seconds.

Step 2: Enter the Switching Delay Setup Mode

- Press the '5' button to enter the Delay Setup Mode.
- The blue LEDs indicate the video mute delay time, if there are no blue LEDs lit, then there is no video delay.
- The red LEDs indicate the audio mute delay time, if there are no red LEDs lit, then there is no audio delay.

	No LEDs lit	= No delay.
•	One left justified LED	= 50ms delay.
••	Two left justified LEDs	= 100ms delay.
•••	Three left justified LEDs	= 200ms delay.
••••	Four left justified LEDs	= 300ms delay.
•••••	Five LEDs	= 500ms delay.
••••	Four right justified LEDs	= 1 sec delay.
•••	Three right justified LEDs	= 2 sec delay.
••	Two right justified LEDs	= 3 sec delay.
•	One right justified LED	= 4 sec delay.

Step 3: Adjust Switching Delay Times

- The 'SEL' button toggles between the video and audio delay settings.
- The 'A1' and 'A2' buttons are used to set the delay times.

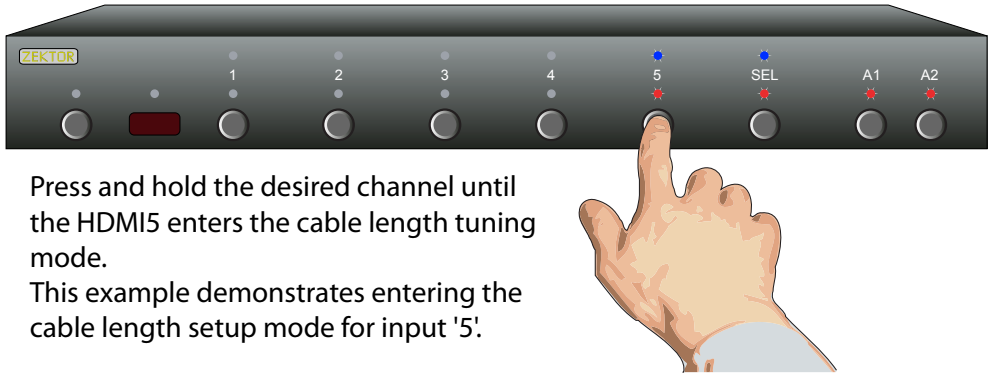
  'A1' decreases the delay time.

  'A2' increases the delay time.

  Press the Power button to save new settings and exit.

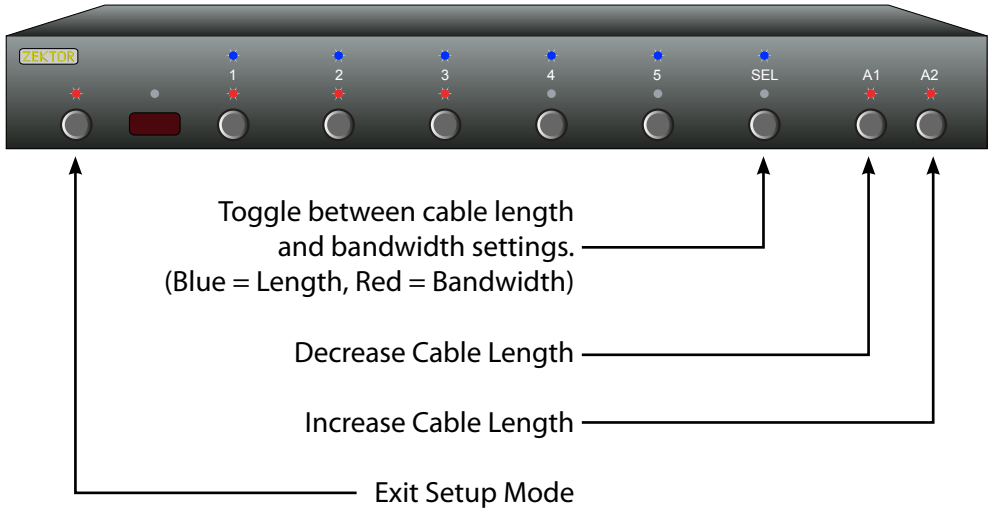
Note: The new settings are saved in non-volatile memory.

Step 1: Place the HDMI5 into the Cable Length Tuning Mode



Press and hold the desired channel until the HDMI5 enters the cable length tuning mode.
This example demonstrates entering the cable length setup mode for input '5'.

Step 2: Adjust cable length settings



Input Cable Length Tuning

The HDMI5 features receiver equalization that can be used to compensate for the losses that occur in varying length, and varying quality, cables.

The HDMI5 allows for 15 levels of equalization. Using high quality DVI or DVI to HDMI conversion cables, the HDMI5 can compensate for cables of up to 65 feet (20 meters), on all its inputs and still reliably receive a stable, sparkle free image at 1080p. Longer cable lengths can be achieved at lower resolutions.

To tune an HDMI5's input to a specific cable length...

Step 1: Place the HDMI5 into the Cable Length Adj. Mode

- Press the desired input and hold the button for 4 seconds, until the HDMI5 enters the Cable Length Adj. Mode.

Step 2: Enter the Cable Length Adj. Mode

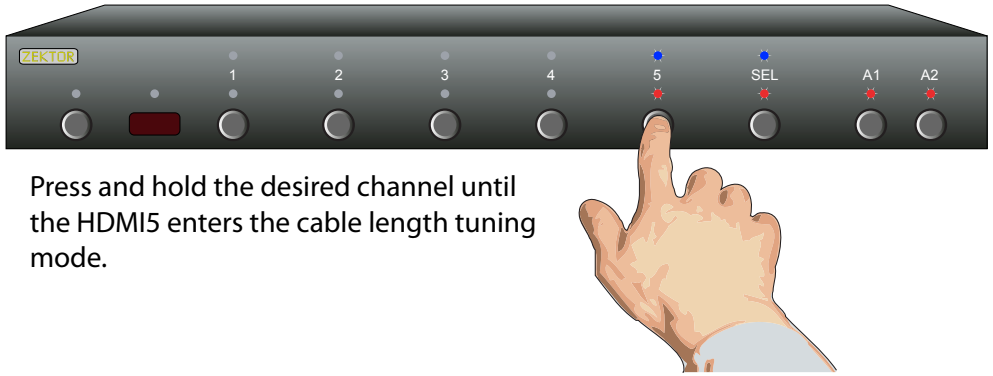
- Use the 'A1' and 'A2' buttons to tune cable length.
  'A1' adjusts for shorter cables.
  'A2' adjusts for longer cables.
  'SEL' switches to Bandwidth settings (See next page).
- Short cables are indicate by only Red LEDs being lit.
- Medium length cables are indicated by only Blue LEDs lit.
- Long cables are indicated by Blue & Red LEDs being lit.
- Use the Power Toggle button to exit the setup mode.

When a cable's tuning is too short, the display will begin to sparkle, eventually going blank. For best results, start long, and use an equalization a step or two above any noticeable artifacts on the screen.

Note: Output cable lengths depend on the display's receiver's capabilities, and the quality of cabling used. The HDMI5 uses source termination to compensate for all lengths of output cables, and to help in cases where the receiver may not have followed the specifications properly.

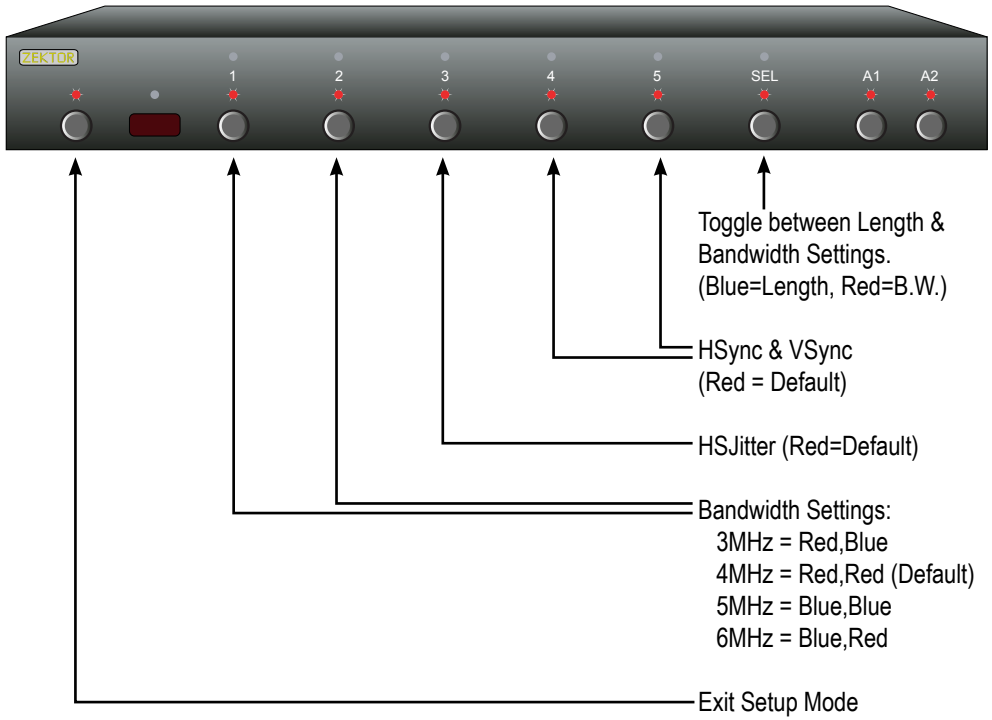
Note: Each input can be tuned individually andall settings are saved in non-volatile memory and are not affected by a power failure.

Step 1: Place the HDMI5 into the Cable Length Tuning Mode



Press and hold the desired channel until the HDMI5 enters the cable length tuning mode.

Step 2: Adjust Bandwidth and Sync Settings



Bandwidth & Sync Settings

The HDMI5 is a fully digital switch, unlike many similar products, the HDMI5 decodes the HDMI/DVI signal and re-encodes it on the output. This allows it to correct for many non-compliant devices attached to its inputs, and always generate fully compliant HDMI/DVI data on its output.

The following parameters are usually best left alone and will have no affect on a fully compliant HDMI/DVI source, but may be useful when connecting to a non-compliant source.

Bandwidth: This setting allows the HDMI5 to sync to sources with clocks that are unstable and are outside the HDMI/DVI specifications. The larger the bandwidth, the better the HDMI5 can to lock on to non-standard sources at the expense of being more susceptible to noise. Some PC cards, and older DVD players, may require this value to be set high (6MHz) to work reliably.

HSJitter: Some non-compliant sources can generate horizontal jitter, causing the screen to jump back and forth horizontally. Enabling this setting (blue LED is lit) will eliminate this problem on all resolutions where the horizontal pixel size is evenly divisible by four.

HSync and VSync: When set to their default values, these settings have no effect on the HSync a VSync signals. If a source and monitor will not work with each other, using the HDMI5 and enabling one or both of these settings (blue LEDs are lit) may fix the incompatibility.

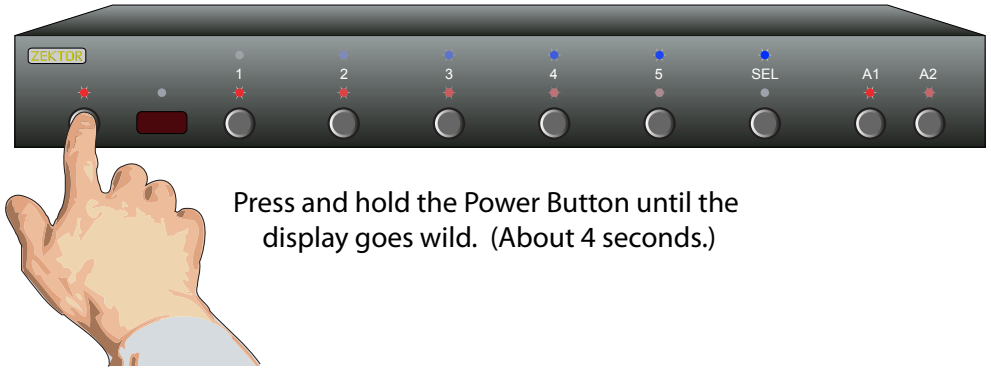
Step 1: Place the HDMI5 into the Cable Length Adj. Mode

- Press the desired input and hold the button for 4 seconds, until the HDMI5 enters the Cable Length Adj. Mode.

Step 2: Switch to the Bandwidth & Sync settings

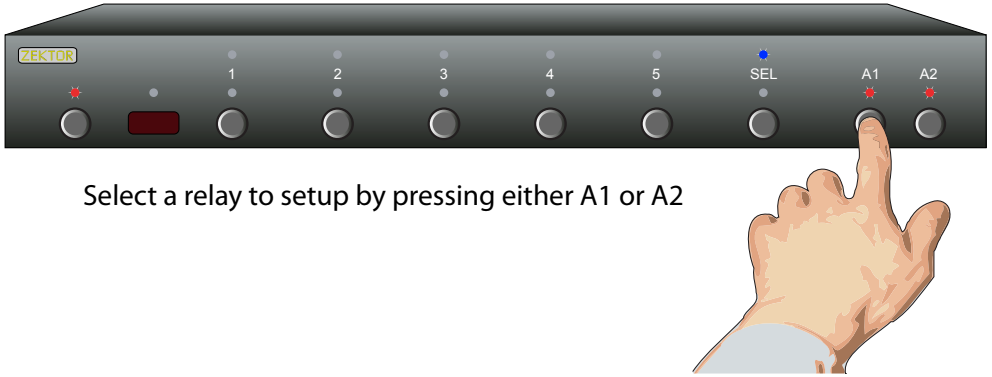
- Press the 'SEL' to toggle to the Bandwidth Settings mode.
- Use '1' and '2' set the HDMI5's receiver's bandwidth.
  - 3MHz = LED '1' Red & LED '2' Blue.
  - 4MHz = LED '1' Red, LED '2' Red (Default, HDMI Spec).
  - 5MHz = LED '1' Blue, LED '2' Blue.
  - 6MHz = LED '1' Blue, LED '2' Red.
- Use '3' to set HSJitter (RED=Default, BLUE=Enabled).
- Use '4' to set HSync (RED=Default, BLUE=Sync always 0).
- Use '5' to set VSync (RED=Default, BLUE=Sync always 0).

Place the HDMI5 into the Setup Mode



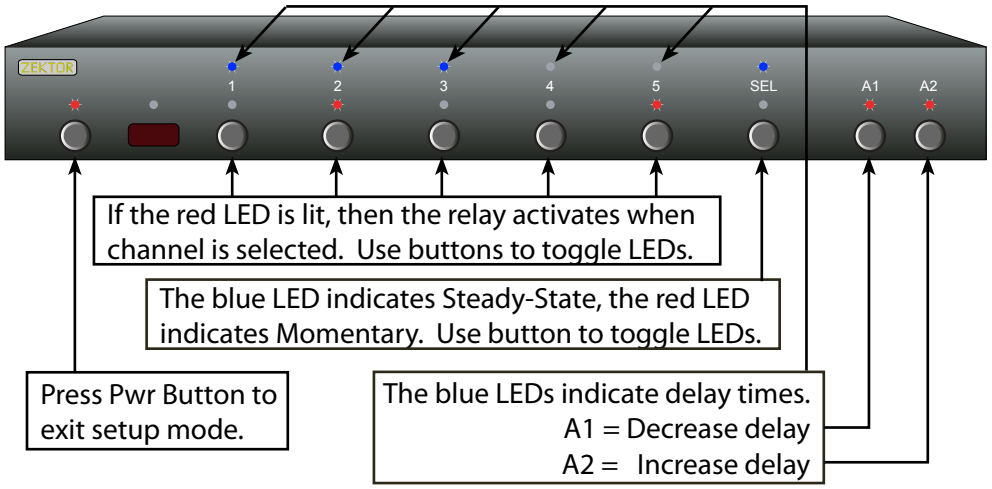
Press and hold the Power Button until the display goes wild. (About 4 seconds.)

Select Relay to Setup (A1 or A2)



Select a relay to setup by pressing either A1 or A2

Relay Setup Overview


ZEKTOR
1
2
3
4
5
SEL
A1
A2
If the red LED is lit, then the relay activates when channel is selected. Use buttons to toggle LEDs.
The blue LED indicates Steady-State, the red LED indicates Momentary. Use button to toggle LEDs.
Press Pwr Button to exit setup mode.
The blue LEDs indicate delay times.
A1 = Decrease delay
A2 = Increase delay

Auxiliary Relay Options

The two general purpose auxiliary relays are rated at 30 volts A.C. or D.C. @ 5 amps, and can be used to control anything within those limits.

There are 4 different operating modes of the Relays:

Mode 1 - Toggle
The relay toggles each time the relay's button is pressed. This is the simplest, and factory default, mode of operation.

Mode 2 - Momentary
Each relay can be setup to stay on a programmed amount of time, and then turn off, each time the relay's button is pressed.

Mode 3 - Channel Controlled - Steady State
The relays can be setup to turn on each time specified channels are selected. By selecting all channels, the relay will turn on each time the HDMI5 is power on, and turn off when the HDMI5 is turned off.

Mode 4 - Channel Controlled - Momentary
The relays can be setup to turn on for a programmed amount time each time specified channels are selected, and then turn off.

Entering the Relay Setup Mode:

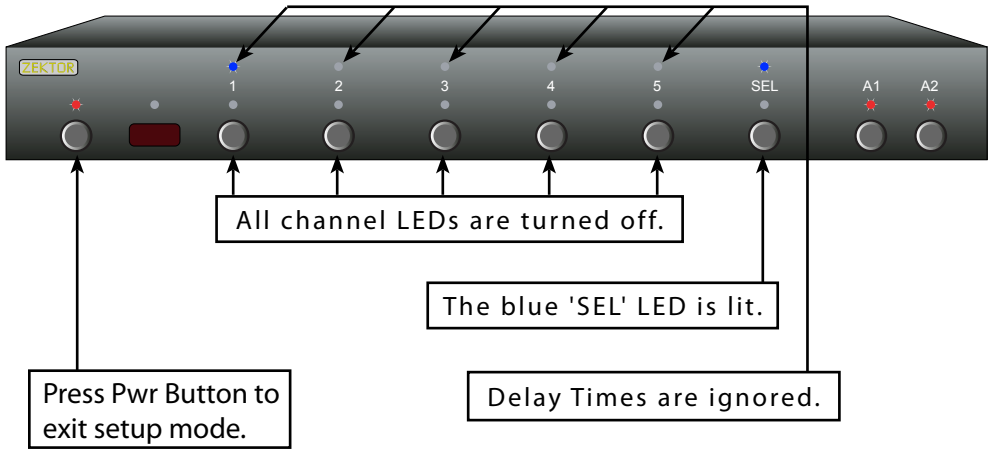
Place the HDMI5 into the Setup Mode
Press and hold the Power to enter Setup Mode.

Select Relay to Setup (A1 or A2)
Chose the relay to setup by pressing A1 or A2.

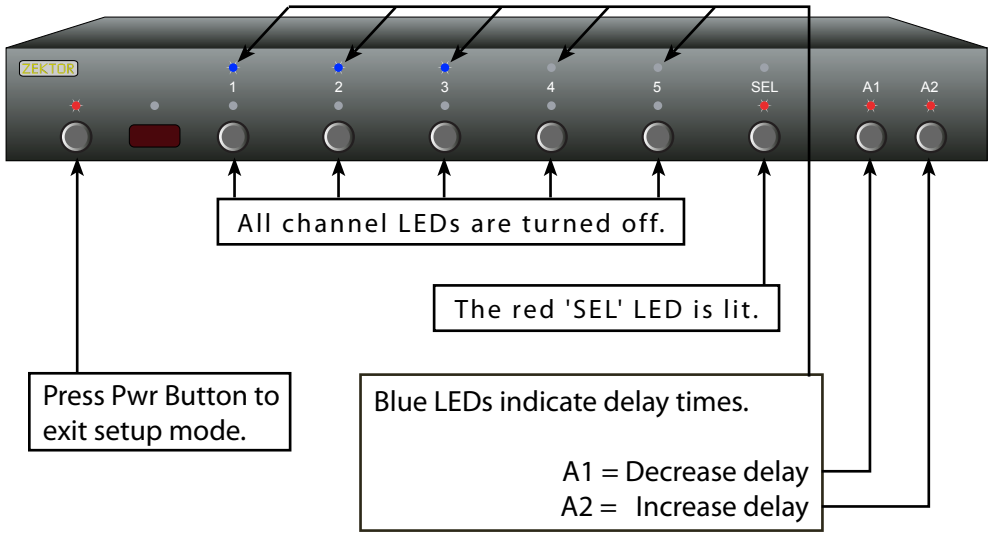
Relay Setup Overview
See illustration for an overview of the Relay Setup Mode.

The following pages describe the settings for each of the different relay modes...

Toggle Mode



Momentary Mode



Relay Options (Cont'd)

Toggle and Momentary Relay Modes

If all channel LEDs are off, then the relay will not be affected by changing channels. The 'SEL' button is used to switch between the Toggle Mode and the Momentary Mode.

Toggle Mode

In the Toggle Mode (the blue 'SEL' LED is lit) the relay will toggle between On and Off each time the relay button is pressed. All relay delay times are ignored in the Toggle Mode.

- Use the 'SEL' button to switch to the Toggle Mode (Blue 'SEL' LED lit).

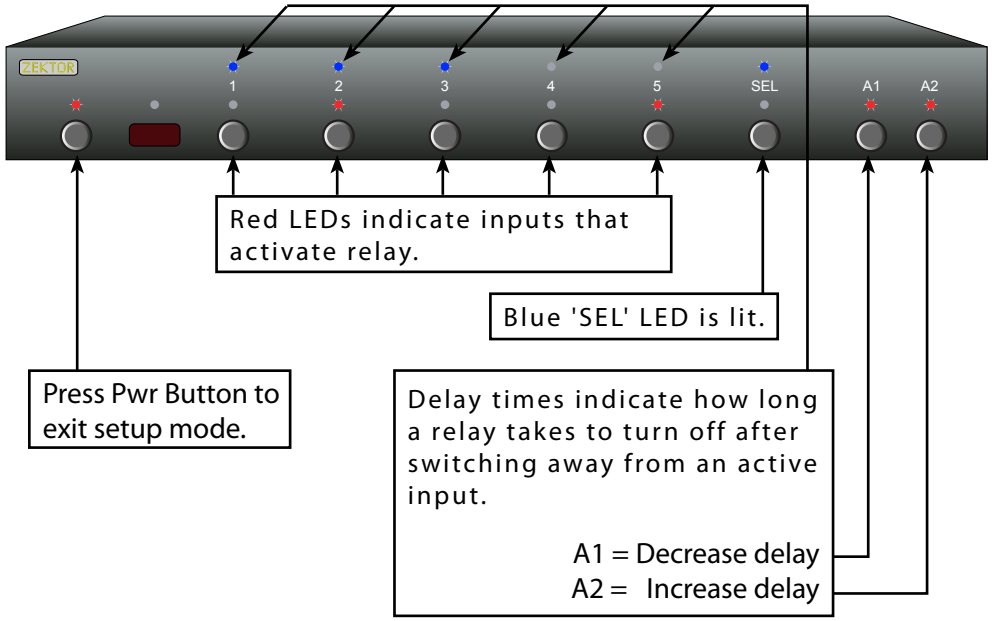
Momentary Mode

In the Momentary Mode (the red 'SEL' LED is lit) the relay will activate when it's button is pressed, and then turn itself off after a programmed amount of time. Use the 'SEL' button to switch to the Momentary Mode (the red 'SEL' LED is lit).

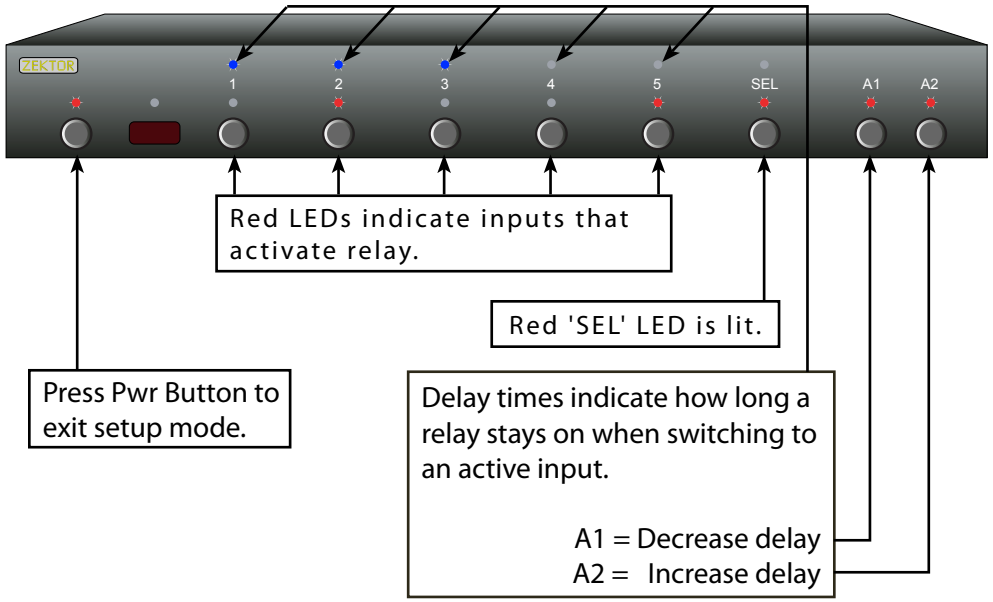
- Use the 'A1' and 'A2' buttons to adjust the amount of time the relay is active before turning itself off. The delay times are indicated by the top row of blue LEDs and correspond to the following times:

	No LEDs lit	= Same as Toggle Mode
•	One left justified LED	= 1/4 seconds
••	Two left justified LEDs	= 1/2 seconds
•••	Three left justified LEDs	= 1 seconds
••••	Four left justified LEDs	= 5 seconds
•••••	Five LEDs	= 10 seconds
••••	Four right justified LEDs	= 30 seconds
•••	Three right justified LEDs	= 1 minute
••	Two right justified LEDs	= 5 minutes
•	One right justified LED	= 10 minutes

Channel Control - Steady State



Channel Control - Momentary



Relay Options (Cont'd)

Channel Control Modes

If any channel LED is lit, then the relay will turn on when that channel is selected during normal operations. The 'SEL' button is used to switch between the Steady State Mode, and the Momentary Mode.

Channel Control - Steady State

In the Steady State Mode (when blue 'SEL' LED is lit) the relay will remain on for as long as the HDMI5 is switched to an input that has been setup to activate the relay. When the HDMI5 is switch to an non-active channel, the relay will turn off after the delay time indicated by the Blue input selection LEDs.

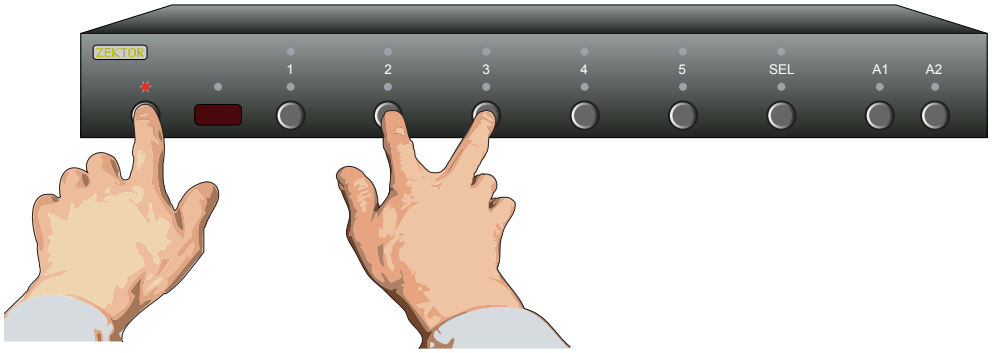
- Use the 'SEL' button to switch to the Steady State Mode (the blue 'SEL' LED is lit).
- Use the Input Select buttons to chose which inputs will activate the relay.
- Use the 'A1' and 'A2' buttons to adjust the amount of time the relay remains active before turning itself off. The delay times are indicated by the top row of blue LEDs and correspond to the delay times given on the previous page.

Channel Control - Momentary

In the Momentary Mode (the blue 'SEL' LED lit) the relay will turn on for the amount of time indicated by the Blue input selection LEDs, whenever the HDMI5 is switched to an input that has been setup to activate the relay.

- Use the 'SEL' button to switch to the Momentary Mode (the red 'SEL' LED is lit).
- Use the Input Select buttons to chose which inputs will activate the relay.
- Use the 'A1' and 'A2' buttons to adjust the amount of time the relay is active before turning itself off. The delay times are indicated by the top row of blue LEDs and correspond to the following times. (See the previous page for relay times.)

Step 1: Reset All Parameters to Factory Defaults



1 Start by pressing and holding the Power button...

2 ...while continuing to hold the Power button, press and hold both the '2' and the '3' buttons.

3 After about 4 seconds, the display will flash indicating all parameters have been restored to their factory programmed values.

Resetting to Factory Defaults

If, for whatever reason, you'd like to reset your HDMI5 back to its factory default condition, this is easily done...

Step 1: Reset All Parameters to Factory Defaults

1. First press and hold the Power button
2. While continuing to hold the Power Button, press and hold both the '2' and '3' buttons.
3. After holding all buttons for about 4 seconds, the display will flash indicating all parameters have been restored to their factory programmed values.

Note: **Resetting the HDMI5 to its default value, resets everything to the same state it was when it left the factory!**

This includes any learned IR codes, all timing information, cable length tuning, etc.

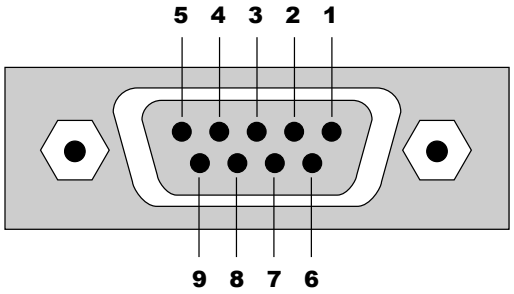
Please be aware of this before issuing this command!

RS-232 Port

The RS-232 on the HDMI5 is the same format as a PC-modem, and uses the same type cable as a serial modem would, which is a standard straight through cable. Do not use a cable that is marked as a "Null Modem" cable.

The HDMI5 can also be used with any USB to RS-232 conversion cable, these are all typically straight through cables.

The RS-232 port is a female type DE-9 connector (sometimes mistakenly referred to as a DB-9 connector) with the following pinout:



Pin definitions:

1 - No Connect	6 - No Connect
2 - TX	7 - No Connect
3 - RX	8 - No Connect
4 - No Connect	9 - No Connect
5 - GND	

The port settings used by the HDMI5 are:

Baudrate:	9600
Data Bits:	8
Stop Bits:	1
Parity:	NONE

The communications protocol used is Zektor's exclusive K.I.S.S.™ (Keep It Simple Serial™) protocol.

K.I.S.S.™ (Keep It Simple Serial!™)

Zektor's exclusive K.I.S.S.™ (Keep It Simple Serial™) protocol was designed by engineers who have been controlling RS-232 devices for most of their careers and understand the pitfalls of a badly designed protocol.

A few features of the K.I.S.S.™ protocol are:

- A simple and logically consistent command structure.
- Fully bi-directional operations and can be operated in both a Master/Slave mode (only responds when spoken to), or in an Asynchronous mode (state changes are sent as they occur).
- All commands and responses can optionally use a checksum or a CRC-8 checkcode to insure reliable communications.
- A command will always generate a response! There are no "timeout" states as part of the protocol. A timeout will always indicate some type of physical connection error (loose cable, extreme noise, etc.).
- Commands and responses have been designed for simple parsing in any language.
- Easy to test using a terminal, or terminal emulation software. (Hyperterm, SecureCRT, etc.)

A few features of the HDMI5 command set are:

- A full featured command set that goes far beyond simple front panel control operations! Allows full control over *all* features of the HDMI5.
- All front panel functions supported.
- Full notification of state changes.
- The ability to disable the front panel, and still have front panel button presses sent to the serial port.
- High resolution control over all timing settings.
- The ability to read all IR codes sent to the HDMI5 by any remote, even those not used by the HDMI5. Use the HDMI5 to add IR control to any project!
- *Many more features, too numerous to list here...*

For a full description of K.I.S.S.™ and a list of the commands supported by the HDMI5, download the HDMI5 supplemental manual at:

www.zektor.com/HDMI5/downloads.htm

+12V On / Off Control

The rear panel jack labeled "IR/Z-IN" allows the HDMI5 to be turned on and off using a +12V control voltage.

To enable/disable the +12V On/Off control functions, see the section entitled: *"Control Functions"*.

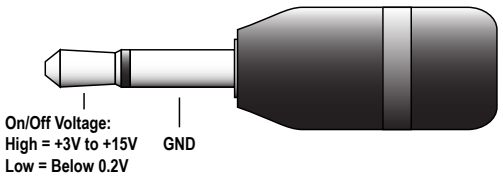
By enabling the +12V On/Off control option, the HDMI5 will turn itself on whenever the voltage going into the Z-IN jack goes from LOW to HIGH, and it will turn itself off whenever the voltage goes from HIGH to LOW.

The HDMI5 only looks at transitions on the Z-IN jack. For instance if it detects a LOW to HIGH transition it will turn itself on. The user can then use the power switch to turn off the HDMI5. After which the voltage on the Z-IN jack must go from HIGH to LOW and then back to HIGH, to once again turn on the HDMI5.

The HIGH level is any voltage above +3V up to +15V.

The LOW level is any voltage below 0.2V.

Any voltage between these two levels is undefined.



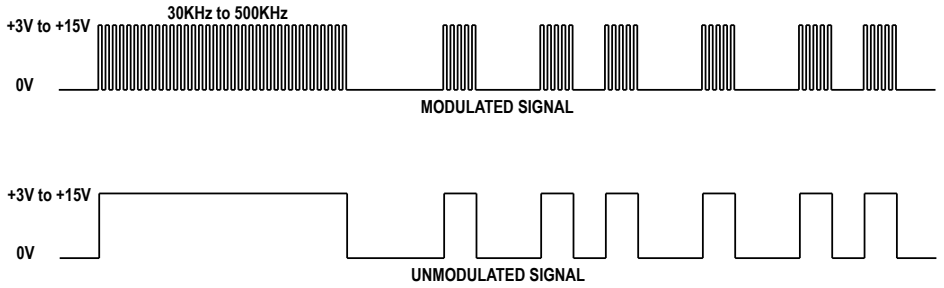
Note: The +12V On/Off control option is mutually exclusive with IR Control jack option, only one of the options can be enabled at a time. When using the "IR/Z-IN" jack as a +12V on/off control, you cannot use the jack for hard-wired control of IR signals.

Rear Panel IR Control

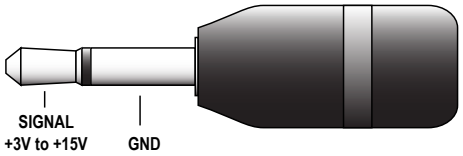
The rear panel jack labeled "IR/Z-IN" allows the HDMI5 to be controlled by hardwired IR controllers.

To enable/disable the rear panel IR jack, see the section entitled: *"Control Functions"*.

The IR signal can be either modulated or unmodulated:



And uses a standard 1/8" (3.5mm) mini-plug:



The signal voltage can range from +3V to +15V.

The signal can be either unmodulated, or modulated with a modulation frequency ranging from 30KHz to 500KHz.

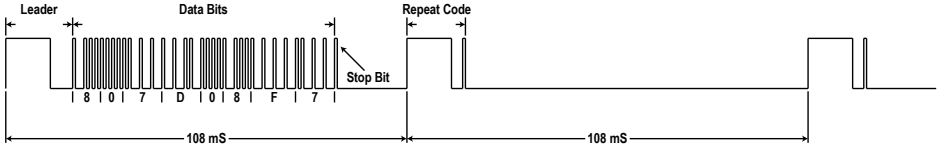
The IR jack recognizes the same IR codes as the front panel IR sensor. If the HDMI5 is taught new codes, these new codes will become the new codes recognized by the IR jack.

Note: The IR control option is mutually exclusive with +12V on/off control option, only one of the options can be enabled at a time. When using the "IR/Z-IN" jack as hard-wired control of IR signals, you cannot use the jack for +12V on/off control.

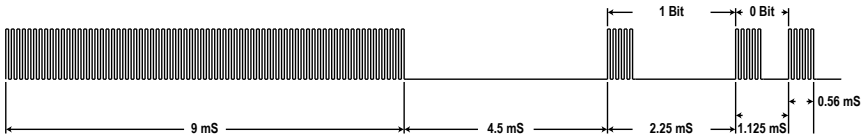
IR Code Format

The default IR codes used by the HDMI5 are 32 bits long, based on the NEC transmission protocol and use a carrier frequency of 38KHz.

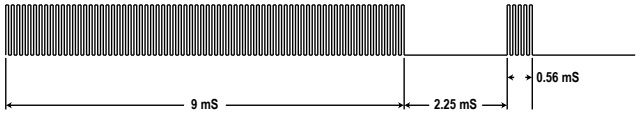
Typical IR Code. Example Code = 807D08F7 (hex):



A magnified view of the Leader and first three data bits:



A magnified view of the Repeat Code (sent when key is held down):



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IR Codes

The following are the factory default codes used by the HDMI5:

Handheld Remote Codes	Function
807D00FF	Power Toggle
807D08F7	'1' Button
807D28D7	'2' Button
807D18E7	'3' Button
807D38C7	'4' Button
807D807F	'5' Button
807DA05F	'SEL' Button
807D906F	'A1' Button
807DB04F	'A2' Button

Discrete Codes	Function
807D04FB	Discrete Power On
807D14EB	Discrete Power Off
807DC43B	Sequence Through Inputs
807D24DB	No Breakaway
807D34CB	Audio Breakaway
807D44BB	Video Breakaway
807D54AB	Discrete Relay 1 On
807D649B	Discrete Relay 1 Off
807D748B	Discrete Relay 2 On
807D847B	Discrete Relay 2 Off

These are the default codes of the HDMI5, they can be easily changed by teaching the HDMI5 a new set of IR codes -- useful if more than one HDMI5 resides in the same room.

To change IR codes, see the sections: "Using a Different Remote" and "Learning New Discrete IR Codes".

Features

Features of the HDMI5:

- True digital switching. By fully decoding the HDMI/DVI signals and re-creating them on the output, the HDMI5 always outputs fully compliant HDMI/DVI signals, regardless of the quality of the signals being received.
- Tunable cable lengths. The HDMI5 incorporates user adjustable equalization on all of it's inputs, allowing the user to tune the HDMI5 to the length and quality of cable used on each input for the absolute best possible match. Allowing cable lengths of 65ft to be used for sparkle free 1080p reception. Even longer lengths are achievable at lower resolutions. Many other adjustments are also available to help clean up poor signals.
- Unmatched control features. The HDMI5 can be controlled using front panel buttons, an IR remote, a hardwired IR remote jack, RS-232, and even a simple +12V On/Off voltage. It can be taught to use a different remote control, allowing you to have an unlimited number of HDMI5's in the same room and still control them all separately. The RS-232 command set is one of the easiest to use on the market and allows unprecedented control over the HDMI5's operations.
- A separate Digital Audio switch. Though required by DVI, in many cases it's simply more convenient to route the digital audio outside the digital video path. The HDMI5 supports all modes of HDMI audio that is sent as part as of the HDMI signals, but it also features a separate Digital Audio switch, with audio breakaway, that can be used to route digital audio signals outside of the HDMI signals. This allows the audio to be routed to a home theater receiver and the video to be sent to the monitor. (Note: The HDMI5 does ***not*** break out the HDMI audio from the HDMI video signals.)
- Adjustable front panel LED intensities. Eliminate the distraction of glaring LEDs by having the front panel dim after a few seconds of sitting idle. The LEDs can even be dimmed to "off".
- Auxiliary Relays. Two dry contact (low voltage) relays are available to control whatever might need controlling. Projection screens, or rack lighting, whatever. Each relay can be controlled using IR, RS-232, or front panel buttons. Setup the relays to turn on when specific inputs are selected, or when the HDMI5 is turned on, or have them operate fully independent of the HDMI5.
- Perfect for the professional home theater installer! The HDMI5 is rack mountable and comes in black or silver. With more control features than any other HDMI/DVI switch on the market, and looks that will match any project, the HDMI5 is your customer's ideal solution!

Specifications

Specifications:

Digital Video Channels	
Protocols:	DVI 1.0, HDMI 1.0 through HDMI 1.2a all modes 1080p All HDMI 1.3 deep color for all modes up to 1080i HDMI 1.3 1080p, 8 bit color only
DVI / HDMI Bandwidth:	1.65GHz bandwidth, 165MHz pixel rate.
HDTV Resolutions:	480p through 1080p, including 720p and 1080i (All Single Link DVI / HDMI modes are supported)
HDCP:	Both DVI and HDMI HDCP modes are supported
HDMI Audio:	Fully supports all HDMI Audio modes
PC Resolutions:	640x480p through 1920x1200p (All Single Link PC resolutions supported)
Digital Audio Channels	
Inputs:	5 Coax, 5 Optical, (Auto conversion between formats)
Outputs:	1 Coax, 1 Optical, (Simultaneous)
Maximum Transfer Rate:	Optical 13.2Mb/S, Coax 50Mb/S
Digital Audio Modes:	PCM, DD5.1, DTS, All digital audio modes supported
Coax Input Level Range:	200mV - 7.0V (PC Soundcard Compatible)
Coax Output Level:	500mV Nominal
Control	
IR Sensor:	Modulation Frequency: 34KHz-42KHz
IR Jack:	+3V to +15V, Un-Mod. or 30KHz to 500KHz Mod. Freq.
+12V Control:	+3V to +15V for ON, less than 0.2V for OFF
Relay Contacts:	Contacts rated at 30 Volts A.C. or D.C. @ 5 Amps
Serial Port:	9600 Baud (8N1), USB Serial Cable Compatible K.I.S.S.™ Protocol, Firmware Upgradable
Power Requirements:	1W Standby, 6W Nominal, 12.5W Worst Case
Voltage Requirements:	90-120VAC, 60Hz
Optional International:	90-264VAC, 47-63Hz
Adapter Power Supply:	Wall Mount, 9V @ 1200ma, U.L. Listed
Dimensions:	Rack Mountable (feet removed), 17”W x 6.5”D x 1.75”H With feet: 17"W x 6.5"D x 1.90"H
Warranty:	**Two Year Parts and Labor**

Warranty Policy

Warranty Policy

ZEKTOR warrants this product against defects in material and workmanship under normal use and service for two years from the original date of purchase. ZEKTOR, at its option, shall repair or replace the defective unit covered by this warranty.

In order to keep this warranty in effect, the product must have been handled and used as prescribed in the instructions accompanying this warranty. This warranty does not cover any damage due to accident, misuse, abuse, or negligence. This warranty is valid only if the product is used as specified in the product documentation.

Repair or replacement, as provided under this warranty, is your exclusive remedy. ZEKTOR shall not be liable for any incidental or consequential damages. Implied warranties of merchantability and fitness for a particular purpose on this product are limited in duration to the duration of this warranty.

Some states/countries do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. Some states/countries do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state and country to country.

Return & Exchange

Shipment of product is as advertised by product. Upon receipt of merchandise inspect product carefully, should you find that the product does not meet your expectations, or satisfaction, contact us at once and tell us your concerns, so we may make every effort to satisfy your purchase.

Contact Information

Instructions for Returning Items

Please retain the dated sales receipt as evidence of the date of purchase. You will need it for any warranty service. If you bought the product through a dealer, installer, or reseller, you will need to return the product to the point of sale.

E-mail or call us, using the information listed under "Customer Service Contact Information", for a Return to Manufacturer Authorization (RMA) number. Describe briefly the reasons for your requested return.

You must receive an RMA # before you return any goods to us. The RMA # must appear on your return packing label or on the outside of the box. Merchandise without an RMA # will be refused. RMA's are valid for twenty (20) days from date of issuance.

All returned merchandise must be shipped in the original packaging. If it is not in the original packaging, ZEKTOR will not be held liable for damage during shipment. Shipments of returns must be prepaid, and we will not accept COD returns.

Customer Service Contact Information:

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12675 Danielson Ct.
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Poway, CA 92064

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Fax: 858-748-8224
E-mail: customerservice@zektor.com
Website: www.zektor.com

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